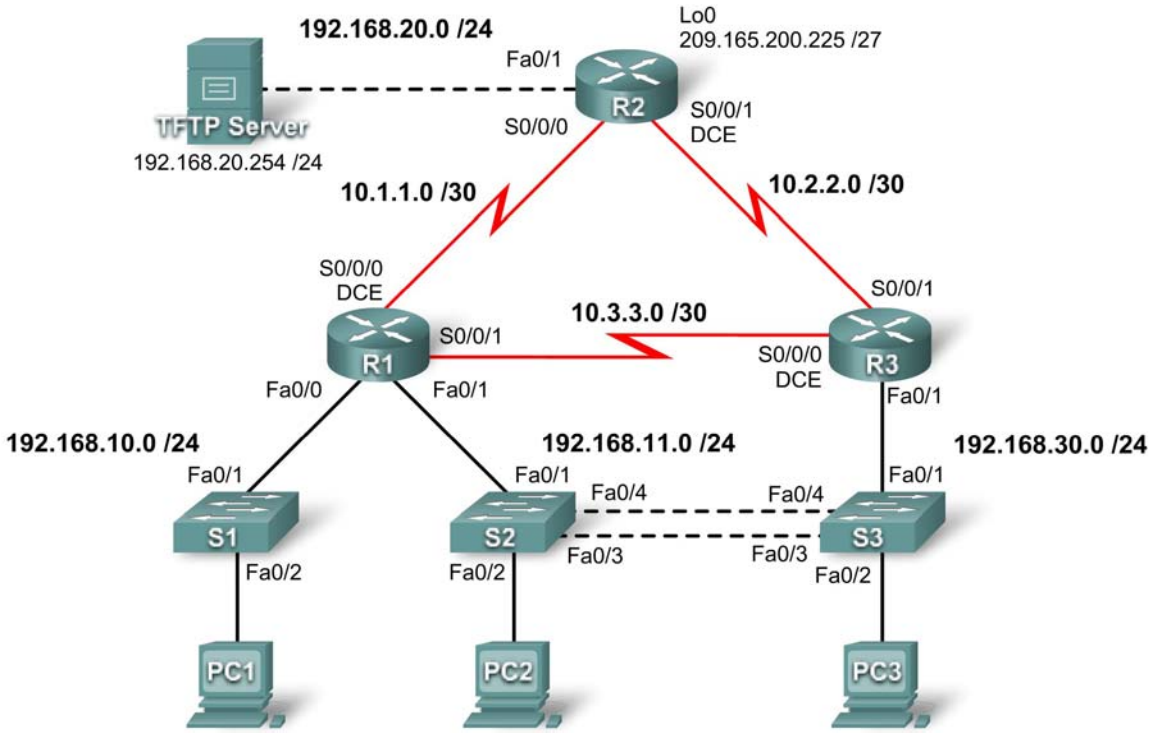
Lab 8.5.1: Troubleshooting Enterprise Networks 1

Topology Diagram



Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	**Fa0/0**	192.168.10.1	255.255.255.0	N/A
	Fa0/1	192.168.11.1	255.255.255.0	N/A
	S0/0/0	10.1.1.1	255.255.255.252	N/A
	S0/0/1	10.3.3.1	255.255.255.252	N/A
R2	**Fa0/1**	192.168.20.1	255.255.255.0	N/A
	S0/0/0	10.1.1.2	255.255.255.252	N/A
	S0/0/1	10.2.2.1	255.255.255.252	N/A
	Lo0	209.165.200.225	255.255.255.224	209.165.200.226
R3	**Fa0/1**	N/A	N/A	N/A
	Fa0/1.11	192.168.11.3	255.255.255.0	N/A
	Fa0/1.30	192.168.30.1	255.255.255.0	N/A
	S0/0/0	10.3.3.2	255.255.255.252	N/A
	S0/0/1	10.2.2.2	255.255.255.252	N/A
S1	**VLAN10**	DHCP	255.255.255.0	N/A
S2	**VLAN11**	192.168.11.2	255.255.255.0	N/A
S3	**VLAN30**	192.168.30.2	255.255.255.0	N/A

PC1	**NIC**	192.168.10.10	255.255.255.0	192.168.10.1
PC2	**NIC**	192.168.11.10	255.255.255.0	192.168.11.1
PC3	**NIC**	192.168.30.10	255.255.255.0	192.168.30.1
TFTP Server	**NIC**	192.168.20.254	255.255.255.0	192.168.20.1

Learning Objectives

Upon completion of this lab, you will be able to:

- Cable a network according to the topology diagram
- Erase the startup configuration and reload a router to the default state
- Load the routers and switches with supplied scripts
- Find and correct all network errors
- Document the corrected network

Scenario

You have been asked to correct configuration errors in the company network. For this lab, do not use login or password protection on any console lines to prevent accidental lockout. Use **ciscoccna** for all passwords in this scenario.

Note: Because this lab is cumulative, you will be using all the knowledge and troubleshooting techniques that you have acquired from the previous material to successfully complete this lab.

Requirements

- S2 is the spanning-tree root for VLAN 11, and S3 is the spanning-tree root for VLAN 30.
- S3 is a VTP server with S2 as a client.
- The serial link between R1 and R2 is Frame Relay. Make sure that each router can ping their own Frame Relay interface.
- The serial link between R2 and R3 uses HDLC encapsulation.
- The serial link between R1 and R3 uses PPP.
- The serial link between R1 and R3 is authenticated using CHAP.
- R2 must have secure login procedures because it is the Internet edge router.
- All vty lines, except those belonging to R2, allow connections only from the subnets shown in the topology diagram, excluding the public address.

Hint:

R2# **telnet 10.1.1.1 /source-interface loopback 0**

Trying 10.1.1.1 ...

% Connection refused by remote host

- Source IP address spoofing should be prevented on all links that do not connect to other routers.
- Routing protocols must be secured. All RIP routers must use MD5 authentication.
- R3 must not be able to telnet to R2 through the directly connected serial link.
- R3 has access to both VLAN 11 and 30 via its Fast Ethernet port 0/0.
- The TFTP server should not get any traffic that has a source address outside the subnet. All devices have access to the TFTP server.
- All devices on the 192.168.10.0 subnet must be able to get their IP addresses from DHCP on R1. This includes S1.

- R1 must be accessible via SDM.
- All addresses shown in the diagram must be reachable from every device.

Task 1: Load Routers with the Supplied Scripts

```
!-----------------------------------------
!                  R1
!-----------------------------------------
no service password-encryption
!
hostname R1
!
boot-start-marker
boot-end-marker
!
security passwords min-length 6
enable secret 5 ciscoccna
!
ip cef
!
ip dhcp pool Access1
   network 192.168.10.0 255.255.255.0
   default-router 192.168.10.1
!
no ip domain lookup
!
username R3 password 0 ciscoccna
username ccna password 0 ciscoccna
!
interface FastEthernet0/0
 ip address 192.168.10.1 255.255.255.0
 ip rip authentication mode md5
 ip rip authentication key-chain RIP_KEY
 no shutdown
!
interface FastEthernet0/1
 ip address 192.168.11.1 255.255.255.0
 ip rip authentication mode md5
 ip rip authentication key-chain RIP_KEY
 no shutdown
!
interface Serial0/0/0
 ip address 10.1.1.1 255.255.255.252
 ip rip authentication mode md5
 ip rip authentication key-chain RIP_KEY
 encapsulation frame-relay

 clockrate 128000
 frame-relay map ip 10.1.1.1 201
 frame-relay map ip 10.1.1.2 201 broadcast
 no frame-relay inverse-arp
 no shutdown
!
interface Serial0/0/1
```



```
 ip address 10.3.3.1 255.255.255.252
 ip rip authentication mode md5
 ip rip authentication key-chain RIP_KEY
 encapsulation ppp
 ppp authentication chap
 no shutdown
!
!
router rip
 version 2
 passive-interface default
 network 192.168.10.0
 network 192.168.11.0
 no auto-summary
!
ip classless
!
no ip http server
!
ip access-list standard Anti-spoofing
 permit 192.168.10.0 0.0.0.255
 deny  any
ip access-list standard VTY
 permit 10.0.0.0 0.255.255.255
 permit 192.168.10.0 0.0.0.255
 permit 192.168.11.0 0.0.0.255
 permit 192.168.20.0 0.0.0.255
 permit 192.168.30.0 0.0.0.255
!
line con 0
 exec-timeout 0 0
 logging synchronous
line aux 0
line vty 0 4
 access-class VTY in
 login local
!
end
!----------------------------------------
!                  R2
!----------------------------------------
no service password-encryption
!
hostname R2
!
security passwords min-length 6
enable secret ciscoccna
!
aaa new-model
!
aaa authentication login LOCAL_AUTH local
aaa session-id common
!
ip cef
!
no ip domain lookup
```



```
!
key chain RIP_KEY
 key 1
  key-string cisco
username ccna password 0 ciscoccna
!
interface Loopback0
 description Simulated ISP Connection
 ip address 209.165.200.245 255.255.255.224
!
interface FastEthernet0/0
 ip address 192.168.20.1 255.255.255.0
 ip access-group TFTP out
 ip access-group Anti-spoofing in
 ip nat outside
 duplex auto
 speed auto
!
interface FastEthernet0/1
 no ip address
 shutdown
 duplex auto
 speed auto
!
interface Serial0/0/0
 ip address 10.1.1.2 255.255.255.0
 ip nat inside
 encapsulation frame-relay
 no keepalive
 frame-relay map ip 10.1.1.1 201 broadcast
 no frame-relay inverse-arp
!
interface Serial0/0/1
 ip address 10.2.2.1 255.255.255.0
 ip access-group R3-telnet in
 ip nat inside
 ip rip authentication mode md5
 ip rip authentication key-chain RIP_KEY
 clockrate 128000
!
!
router rip
 version 2
 passive-interface default
 no passive-interface Serial0/0/0
 no passive-interface Serial0/0/1
 network 10.0.0.0
 network 192.168.20.0
 default-information originate
 no auto-summary
!
ip classless
ip route 0.0.0.0 0.0.0.0 209.165.200.226
!
no ip http server
ip nat inside source list NAT interface FastEthernet0/0 overload
```



```
!
ip access-list standard Anti-spoofing
 permit 192.168.20.0 0.0.0.255
 deny  any
ip access-list standard NAT
 permit 10.0.0.0 0.255.255.255
 permit 192.168.0.0 0.0.255.255
!
ip access-list extended R3-telnet
 deny   tcp host 10.2.2.2 host 10.2.2.1 eq telnet
 deny   tcp host 10.3.3.2 host 10.2.2.1 eq telnet
 deny   tcp host 192.168.11.3 host 10.2.2.1 eq telnet
 deny   tcp host 192.168.30.1 host 10.2.2.1 eq telnet
 permit ip any any
!
ip access-list standard TFTP
 permit 192.168.20.0 0.0.0.255
!
control-plane
!
line con 0
 exec-timeout 0 0
 logging synchronous
line aux 0
 exec-timeout 15 0
 logging synchronous
 login authentication local_auth
 transport output telnet
line vty 0 4
 exec-timeout 15 0
 logging synchronous
 login authentication local_auth
 transport input telnet
!
end
!----------------------------------------
!                  R3
!----------------------------------------
no service password-encryption
!
hostname R3
!
security passwords min-length 6
enable secret ciscoccna
!
no aaa new-model
!
ip cef
!
no ip domain lookup
!
key chain RIP_KEY
 key 1
  key-string cisco
username R1 password 0 ciscoccna
username ccna password 0 ciscoccna
```



```
!
interface FastEthernet0/1
 no shutdown
!
interface FastEthernet0/1.11
 encapsulation dot1Q 11
 ip address 192.168.11.3 255.255.255.0
 no snmp trap link-status
!
interface FastEthernet0/1.30
 encapsulation dot1Q 30
 ip address 192.168.30.1 255.255.255.0
 ip access-group Anti-spoofing in
 no snmp trap link-status
!
!
interface Serial0/0/0
 ip address 10.3.3.2 255.255.255.252
 encapsulation ppp
 clockrate 125000
 ppp authentication chap
!
interface Serial0/0/1
 ip address 10.2.2.2 255.255.255.252
!
router rip
 version 2
 passive-interface default
 no passive-interface FastEthernet0/0.11
 no passive-interface FastEthernet0/0.30
 no passive-interface Serial0/0/0
 no passive-interface Serial0/0/1
 network 10.0.0.0
 network 192.168.11.0
 network 192.168.30.0
 no auto-summary
!
ip classless
!
ip http server
!
ip access-list standard Anti-spoofing
 permit 192.168.30.0 0.0.0.255
 deny  any
ip access-list standard VTY
 permit 10.0.0.0 0.255.255.255
 permit 192.168.10.0 0.0.0.255
 permit 192.168.11.0 0.0.0.255
 permit 192.168.20.0 0.0.0.255
 permit 192.168.30.0 0.0.0.255
!
control-plane
!
line con 0
 exec-timeout 0 0
 logging synchronous
```



```
line aux 0
 exec-timeout 15 0
 logging synchronous
line vty 0 4
 access-class VTY in
 exec-timeout 15 0
 logging synchronous
 login local
!
end
!----------------------------------------
!                S1
!----------------------------------------
no service password-encryption
!
hostname S1
!
security passwords min-length 6
enable secret ciscoccna
!
no aaa new-model
vtp domain CCNA_Troubleshooting
vtp mode transparent
vtp password ciscoccna
ip subnet-zero
!
no ip domain-lookup
!
no file verify auto
spanning-tree mode pvst
spanning-tree extend system-id
!
vlan internal allocation policy ascending
!
vlan 10
!
interface FastEthernet0/1
 switchport access vlan 10
 switchport mode access
!
interface FastEthernet0/2
 switchport access vlan 10
 switchport mode access
!
interface range FastEthernet0/3-24
!
interface GigabitEthernet0/1
 shutdown
!
interface GigabitEthernet0/2
 shutdown
!
interface Vlan1
 no ip address
 no ip route-cache
!
```



```
interface Vlan10
 ip address dhcp
 no ip route-cache
!
ip default-gateway 192.168.10.1
ip http server
!
control-plane
!
line con 0
 exec-timeout 0 0
 logging synchronous
line vty 0 4
 password ciscoccna
 login
line vty 5 15
 no login
!
end
!----------------------------------------
!                 S2
!----------------------------------------
no service password-encryption
!
hostname S2
!
security passwords min-length 6
enable secret ciscoccna
!
no aaa new-model
vtp domain CCNA_Troubleshooting
vtp mode transparent
vtp password ciscoccna
ip subnet-zero
!
no ip domain-lookup
!
no file verify auto
!
spanning-tree mode rapid-pvst
spanning-tree extend system-id
spanning-tree vlan 11 priority 24576
spanning-tree vlan 30 priority 28672
!
vlan internal allocation policy ascending
!
interface FastEthernet0/1
 switchport access vlan 11
 switchport mode access
!
interface FastEthernet0/2
 switchport access vlan 11
 switchport mode access
!
interface FastEthernet0/3
 switchport trunk native vlan 99
```



```
 switchport trunk allowed vlan 11,30
 switchport mode trunk
!
interface FastEthernet0/4
 switchport trunk native vlan 99
 switchport trunk allowed vlan 11,30
 switchport mode trunk
!
interface range FastEthernet0/5-24
 shutdown
!
interface GigabitEthernet0/1
 shutdown
!
interface GigabitEthernet0/2
 shutdown
!
interface Vlan1
 no ip address
 no ip route-cache
!
interface Vlan11
 ip address 192.168.11.2 255.255.255.0
 no ip route-cache
!
ip http server
!
control-plane
!
line con 0
 exec-timeout 0 0
 logging synchronous
line vty 0 4
 password ciscoccna
 login
line vty 5 15
 no login
!
end
!----------------------------------------
!                S3
!----------------------------------------
no service password-encryption
!
hostname S3
!
security passwords min-length 6
enable secret ciscoccna
!
no aaa new-model
vtp domain CCNA_troubleshooting
vtp mode server
vtp password ciscoccna
ip subnet-zero
!
no ip domain-lookup
```



```
!
no file verify auto
!
spanning-tree mode rapid-pvst
spanning-tree extend system-id
spanning-tree vlan 11 priority 28672
spanning-tree vlan 30 priority 24576
!
vlan internal allocation policy ascending
!
!
interface FastEthernet0/1
 switchport trunk allowed vlan 30
 switchport mode trunk
!
interface FastEthernet0/2
 switchport access vlan 30
 switchport mode access
!
interface FastEthernet0/3
 switchport trunk native vlan 99
 switchport trunk allowed vlan 11,30
 switchport mode trunk
!
interface FastEthernet0/4
 switchport trunk native vlan 99
 switchport trunk allowed vlan 11,30
 switchport mode trunk
!
interface range FastEthernet0/5-24
 shutdown
!
interface GigabitEthernet0/1
 shutdown
!
interface GigabitEthernet0/2
 shutdown
!
interface Vlan1
 no ip address
 no ip route-cache
!
interface Vlan30
 ip address 192.168.30.2 255.255.255.0
 no ip route-cache
!
ip default-gateway 192.168.30.1
ip http server
!
control-plane
!
line con 0
 exec-timeout 5 0
 logging synchronous
line vty 0 4
 password ciscoccna
```



```
 login
line vty 5 15
 no login
!
end
```

Task 2: Find and Correct All Network Errors

Task 3: Verify that Requirements Are Fully Met

Task 4: Document the Corrected Network

Task 5: Clean Up

Erase the configurations and reload the routers. Disconnect and store the cabling. For PC hosts that are normally connected to other networks (such as the school LAN or to the Internet), reconnect the appropriate cabling and restore the TCP/IP settings.

